

Heteans were never handsome, but their type became necessarily modified through the ages, and where they have come into contact with Semitic peoples they have, to a greater or less extent, taken the impress thereof. It results from the deep studies of which the Heteans have been the subject that at an epoch anterior to that of the organization of the Hebrews into a nation, and even anterior to the conquest of Canaan by the Israelites, they played an important part in the great strifes with the Egyptians. The Heteans and Amoreans appear to have been intimately connected in the mountains of Palestine.

It is probably in the train of its adoption by the Turcoman emirs that the double-headed eagle, set apart from the remotest antiquity for the divinities and kings of the Hetean nation, was brought home by the crusaders in the fourteenth century. It is thus that it became the emblem of the empire of Germany, and later on that of the empires of Austria and Russia, perpetuating in this way its high symbolic destiny through the ages.

One of our interesting discoveries at Euyuk was that of two stones bearing Phrygian inscriptions, the longest that are known after that of the tomb of Midas.

NOVEL USE OF THE TELEPHONE.

On the occasion of the celebration of the twenty-fifth anniversary of the Chicago fire in Chicago, on October 9, the telephone transmitter was brought into use in rather a novel way.

At the telephone building, 203 Washington Street, by which the procession passed, were fixed four long distance transmitters behind large sound collecting funnels, similar to those used on phonographs, two or three being attached to the balcony of the building and one suspended by wires over the center of the street, as shown in our illustration, said to be nine feet long and four feet in diameter at the large end. Above this was suspended the banner on which were the words, "Your cheers here will be heard throughout the Union." All of the transmitters were operated by storage batteries, and were connected to long distance wires leading to New York and the most distant points west. For five hours and a quarter the procession passed under this transmitter, and a continual stream of music from the different bands, combined with the cheers of the processionists and spectators, was sent over the wires, going to New York, Boston, Philadelphia, to Canton, Ohio, the home of one of the presidential candidates, and to many other places. On seeing the banner over the transmitter, the approaching drum major of each band would change the rattle of drums to some pleasing patriotic air, to be heard by the many listeners in distant cities. In this city and other eastern points it is said the words of the cheers as well as the music of the band was plainly heard.

Probably no event was ever before so widely distributed by means of the telephone. This event recalls to our attention the difficulty experienced in the early days of the telephone, before the time of metallic circuits, when a successful effort was made to transmit the sermon of Henry Ward Beecher from the platform of Plymouth Church as far as Elizabeth, New Jersey, by means of two Blake transmitters affixed to the pulpit, a distance of but fifteen miles, over an ordinary telegraph wire. The transmission of the Chicago celebration so readily as has been stated is a striking example of the remarkable progress that has been made in the art of telephony within a decade. We are indebted to the Western Electrician, of Chicago, for the use of the illustration. The small picture in the corner is of the press review stand, at which a transmitter was also located. The arrangements for transmitting the sounds were made by S. G. McMeen, engineer of the Central Union Telephone Company, and the Chicago Telephone Company.

THE British consul-general at Frankfort, in the course of his latest report, states that the cost of a civil engineer's course, including that of living, is estimated at 6,000 marks for four years. At other German universities the cost would be somewhat less, but the difference would not be very great, for the main item—the cost of living—is very much the same in all university towns. Foreign students often prefer the smaller universities, especially those in South Germany.

Sanitary Engineering.

The existence of a separate body of professional men devoted to sanitation is one of the evidences of the improved conditions under which we live. There was a time, not so distant but it is well within the memory of many people living to-day, when the profession of sanitary engineering as such did not exist. The architect who designed the homes, and the engineer who looked after the cities, were supposed to provide for the comfort and convenience of the householders; but the idea of a separate profession, whose duty it should be to advise upon those features of a house or a city which concern the health and cleanliness of the people is modern, and has only taken practical shape of recent years. The growth of this branch of engineering is not due to any deliberate effort to create a separate profession; but rather to the growth of intelligent knowledge of the laws of sanitation, and the demand of the public that these laws shall be followed in the construction of their homes, and is one thus affecting their municipal well-being. The public enlightenment has come as the result of the teachings of science and bitter experience. While medical men have been urging the need for pure water supply, good drainage, and abundant ventilation, the scourge of epidemic has descended with a terrible persistency to indorse their teaching. The board of health, with its statistics of sickness and mortality, has proved to a demonstration that there is an intimate relation between a city's drainage and its death rate, and that hygiene and health go hand in hand.

The birth of the present movement in favor of improved sanitation took place within the present half

ing stable or burial ground. To-day the water supply of a great city is gathered high up among the hills, at the uncontaminated headwaters of the rivers. The supply is frequently impounded at a point from fifty to one hundred miles from the city. New York City draws its supply from the Croton River, forty miles distant: Liverpool has its Vyrnwy reservoir situated seventy miles distant among the Welsh hills, and to the south of Vyrnwy it is now proposed to create enormous reservoirs for the supply of London, and build some two hundred miles of aqueduct to carry the water.

Closely related to the water supply is the matter of house and city drainage. Open plumbing and self-flushing closets have been the death blow to many diseases which formerly lurked in inaccessible drains, and the pernicious, boxed up closets of the last generation. It used to be that the periodical return of sickness to a home would be ultimately traced (as well it might be) to "defective drainage;" and the general tearing up and reconstruction which followed was but a half cure for defects which called for an abundant flushing with water, that the city's limited supply was unable to give. And the reform which has purified the house has extended to the city. The cesspool is growing mercifully scarce (at least in America and England), and the public are fast awakening to the fact that the discharge of sewage into a river is fraught with danger to every city or hamlet that is built upon its banks. The triumphs of sanitary engineering are nowhere more manifest than in those elaborate plants which have been established for the purification of sewage and the recovery of its organic matter as a valuable commercial product.

Side by side with the improvement of drainage and water supply, has come a better knowledge of the laws of ventilation and improved methods for securing it. The low ceilings and cramped passages of the last generation have given place to lofty rooms and commodious halls. Time was when in designing a house the provision of sleeping accommodation was almost an afterthought. The junior members of a household were crowded into small, stuffy rooms, and the domestics found a couch where they could—generally in small attics tucked away in the angles of the roof. But improved sanitation may justly claim to have changed all that, and in addition to removing the noxious gases which arose from defective drains, it has taught the need for large, airy, and wholesome sleeping rooms. We find to-day that the bedrooms are among the finest in the house, lofty, well lighted, and with means for regulating the temperature in the winter months.

In thus reviewing the progress of sanitary engineering, it must be borne in mind that

its benefit is not merely a negative one. It has diminished the amount of disease, and it has cut down the death rate; but, over and above this, and perhaps greatest blessing of all, in purifying and sweetening the surroundings of their daily life, it has brought a permanently bettered condition of morals and character to mankind at large.

The Test of the Long Range.

In order to test the efficiency of infantry fire at long ranges under certain circumstances, an experiment was made in Switzerland by firing from the hamlet of Replands, at an altitude of 3,760 feet, at a surface of snow, about a mile and a quarter off as the crow flies, at the foot of the Mont de Baulmes. The target was a rectangle 165 feet wide by 200 feet deep, sloping at an angle of 10 deg., and was marked at the four corners by flags, and rendered more conspicuous by a piece of black cloth, 8 feet by 10 feet, spread at the base of the rectangle. Fourteen medium shots were told off to fire independently a total of 500 carefully aimed shots within sixteen minutes, between 2:15 and 2:31 P. M., the weather being very fine, with bright sunshine and a dry and perfectly calm atmosphere. The thermometer indicated 20 deg. Fahrenheit. The snow was hard frozen, smooth, and free from any mark, and the slightest graze of the surface was distinctly visible, so that every hit could be clearly traced. It was found that out of the 500 shots, 338, or 67 per cent, had hit the target, besides twenty which had struck above, and twenty-six which had struck below the rectangle, within a radius of about 30 feet. The remaining shots struck within about 100 yards, either short or over the target, while a very few had deviated sideways.—*La France Militaire.*



A TELEPHONE STREET MUSIC TRANSMITTER, CHICAGO CELEBRATION.

century, and indeed its best work has been done in the past twenty-five years. This is clearly evident if we compare the average dwelling of the earlier period with the average house of to-day, especially if the comparison be made in the homes erected for the middle and working classes. Household conveniences, which were then to be found only in the homes of the rich, are now at the command of the laboring man, and it will soon be a rare occurrence for a cottage to be built which does not contain a bathroom, open plumbing, and a heater in the basement.

Of all the sanitary improvements affecting the public health in cities, there is none to equal that which has been made in the matter of water supply; for while it is true that open plumbing, improved closets, and the domestic bath are vital to public health, it must be remembered that their existence is only possible where there is an abundant supply of water. It is in the volume as well as in the quality of water supply that we have advanced; and the one was as necessary as the other.

The higher death rate of former years was largely due both to the scarcity and the impurity of the public water supply. It frequently happened that this supply was pumped from an adjacent river, that was carrying the drainage of towns and villages which lay nearer its source. The water was distributed to the city mains without sufficient filtration, and to the chemical impurities was added a larger or smaller amount of organic matter, which was an easy breeder of typhoid and kindred diseases. River supply was supplemented by so-called wells, which were often mere cisterns for the catching of surface rainfall, and such filth as might enter by seepage from adjacent sewers or the neighbor-